

AMENDMENTS

Please amend the above-identified application, as follows:

In the Claims:

Please delete claims 2, 18, and 19.

Please replace claims 1, 3, 7, 18, 23, 41, 44-48 and add new claims 49 and 50 as set forth below.

B1
1. (Amended) A total-reflection x-ray fluorescence apparatus comprising:
an x-ray source for providing x-rays;
a doubly-curved x-ray optic for diffracting and focusing the x-rays provided by the x-ray source;
a surface onto which at least some of the diffracted and focused x-rays are directed; and
an x-ray detector for detecting resultant x-ray fluorescence emitted by any foreign matter present on the surface.

B2
28. (Amended) An apparatus as recited in claim 1 wherein the doubly-curved x-ray optic is a crystal or multi-layer x-ray optic.

B3
7. (Amended) An apparatus as recited in claim 6 wherein the one or more apertures are positioned before the x-ray optic.

B4
33 48. (Amended) A method for detecting presence of foreign matter on a surface by total x-ray diffraction using a doubly-curved x-ray optic, comprising:
providing a source of x-rays;
diffracting and focusing at least some of the x-rays using a doubly-curved x-ray optic and impinging the diffracted and focused x-rays upon the surface;
and

B4
cond.
detecting flourescent x-rays responsive to the impingement from any
foreign matter present on the surface.

B5
23. (Amended) ~~A method as recited in claim 22, wherein the passing
through at least one aperture is practiced before the x-ray optic.~~

B6
41. (Amended) An apparatus as recited in claim 1 wherein the x-ray
source and the point of impingement upon the surface define an optic circle of
radius R , and wherein the doubly-curved x-ray optic comprises a surface and a
plurality of atomic planes of radius R_p which intersect the surface at an angle α ;
and wherein the radius of the atomic planes R_p of the doubly-curved x-ray optic
is defined by the equation $R_p = 2R \cos \alpha$.

B7
27 ~~44~~. (Amended) An apparatus as recited in claim ²⁴~~41~~, wherein the doubly-
curved x-ray optic is curved to a toroidal, ellipsoidal, spherical, parabolic, or
hyperbolic shape.

²⁴
28 ~~45~~. (Amended) An apparatus as recited in claim ²⁴~~41~~, wherein the doubly-
curved x-ray optic exhibits asymmetric Bragg diffraction.

²⁴
29 ~~46~~. (Amended) An apparatus as recited in claim ²⁴~~41~~, wherein the doubly-
curved x-ray optic also focuses the x-rays on to the surface.

²⁹
30 ~~47~~. (Amended) An apparatus as in claim ²⁹~~46~~, wherein the doubly-curved x-
ray optic focuses x-rays to a footprint on the surface and wherein the footprint
comprises a largest dimension less than 1 mm.

³⁰
31 ~~48~~. (Amended) An apparatus as in claim ³⁰~~47~~, wherein the doubly-curved x-
ray optic focuses x-rays to a footprint on the surface wherein the footprint
comprises a largest dimension less than 500 microns.

Application of Ch n
Application No. 09/667,966

Please introduce the following new claims:

8 49. (New) An apparatus as recited in claim ~~8~~⁵, wherein the one or more apertures are positioned after the x-ray optic.

36 50. (New) A method as recited in claim ~~22~~³⁰, wherein the passing through at least one aperture is practiced after the x-ray optic.
